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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2013-14

08.03.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014

Date of Testing : 08.03.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7590**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	185	185	2.4	97.6	95-100
22.4	2650	2835	37.4	62.6	60-80
11.2	1185	4020	53.0	47.0	40-60
4.75	925	4945	65.2	34.8	25-40
2.36	950	5895	77.7	22.3	15-30
0.600	510	6405	84.4	15.6	8-22
0.075	900	7305	96.2	3.8	0-8

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/Gradation/2013-14

08.03.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014

Date of Testing : 08.03.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **7410**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	190	190	2.6	97.4	95-100
22.4	2505	2695	36.4	63.6	60-80
11.2	1095	3790	51.1	48.9	40-60
4.75	955	4745	64.0	36.0	25-40
2.36	965	5710	77.1	22.9	15-30
0.600	450	6160	83.1	16.9	8-22
0.075	895	7055	95.2	4.8	0-8

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/AIV/2013-14

07.03.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	07.03.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	301	
4	Aggregate Impact value = percent fines	20.63	20.79	
	100* (W_2/W_1)%			20.71

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/WMM/S-T/2013-14 07.03.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP,
Reference	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	07.03.2014

Result : Flakiness Index = **12.58%**

Elongation Index = **13.28%**

Result : Combined Flakiness & Elongation index **25.86%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/BC/AIV/2013-14 14.03.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.03.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.82	22.02	21.92

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 27%

Note:

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Job No.: CTCE/BBMP/W.No.09/KRIDL/BC/Shape_T/2014-15 : 14.03.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminous Concrete
Date of Testing	: 14.03.2014

Result : Flakiness Index = **11.28%**

Elongation Index = **13.29%**

Result : Combined Flakiness & Elongation index **24.57%**

Comments:

Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/BC/Stripping/2013-14 14.03.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
Type of Mix	Bituminous Concrete
Date of Testing	14.03.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/KRIDL/BC/Sp_Wa/2013-14 14.03.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
Type of Mix	Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	14.03.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2025	2026	2022	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1270	1271	1267	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2015	2014	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	746	744	747	
6	Weight of oven dried aggregate	W_4 g	2000	2001	2003	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.681	2.690	2.681	2.684
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.740	2.741	2.721	2.734
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.80%	0.70%	0.55%	0.68%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No: CTCE/BBMP/W.No.09/KRIDL/BC/Bitumen/2013-14 14.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division,
REFERENCE	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
SAMPLE I/D	Roads in Telecom Layout ward No.09, BBMP, Bangalore.
DATE OF TESTING	14.03.2014

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	471	474
3. Weight of Asphalt and Mineral matter Extracted, g	29	26
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	29	26
7. Bitumen content in %	5.80	5.20
8. Average	**5.50**	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.00	100.00	100
13.2	85.25	86.35	79-100
9.5	81.23	86.69	70-88
4.75	59.36	58.65	53-71
2.36	46.32	45.69	42-58
1.18	36.32	36.25	34-48
0.6	32.26	30.25	26-38
0.3	22.32	25.32	18-28
0.15	16.33	16.32	12-20
0.075	6.32	6.69	4-10

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Job No: CTCE/BBMP/W.No.09/KRIDL/BC/Bitumen/2013-14 14.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division,
REFERENCE	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
SAMPLE I/D	Roads in Telecom Layout ward No.09, BBMP, Bangalore.
DATE OF TESTING	14.03.2014

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	470.5
3. Weight of Asphalt and Mineral matter Extracted, g	26	29.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	26	29.5
7. Bitumen content in %	5.20	5.90
8. Average	**5.55**	

GRADATION AFTER EXTRACTION

TABLE - 1

SIEVE SIZE	Percent Passing, %		JOBMIX
mm	Sample 1	Sample 2	Gradation
19	100.00	100.00	100
13.2	86.36	85.25	79-100
9.5	82.36	83.25	70-88
4.75	55.56	56.36	53-71
2.36	48.25	49.32	42-58
1.18	37.23	38.21	34-48
0.6	29.36	30.28	26-38
0.3	23.25	24.32	18-28
0.15	15.25	16.35	12-20
0.075	6.85	7.12	4-10

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GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014

Date of Testing : 07.03.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **25600**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	995	995	3.9	96.1	95-100
22.4	5590	6585	25.7	74.3	60-80
11.2	5780	12365	48.3	51.7	40-60
4.75	4150	16515	64.5	35.5	25-40
2.36	3990	20505	80.1	19.9	15-30
0.600	2285	22790	89.0	11.0	8-22
0.075	2525	25315	98.9	1.1	0-8

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Job No.: CTCE/BBMP/W.No.09/KRIDL/SDBC/Bitumen/2013-14 14.03.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements and Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09 in Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/VSD/PR/445/6/2013-14 Dated: 28.02.2014
SAMPLE I/D	Asphalting to Telecom Layout road from more to Kempegowda Nagar in Ward No.09
DATE OF TESTING	14.03.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	475
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26	25.00
7. Bitumen content in %	5.20	5.00
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	38.79	8.18	8.18	91.82	90-100
4.75	263.1	55.51	63.69	36.31	35-51
2.36	57.13	12.05	75.74	24.26	24-39
1.18	42.56	8.98	84.72	15.28	15-30
0.3	28.97	6.11	90.83	9.17	9-19
0.075	27.25	5.75	96.58	3.42	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	27.32	5.46	5.46	94.54	90-100
4.75	241.6	48.32	53.78	46.22	35-51
2.36	89.4	17.88	71.66	28.34	24-39
1.18	52.78	10.56	82.22	17.78	15-30
0.3	33.25	6.65	88.87	11.13	9-19
0.075	24.85	4.97	93.84	6.16	3-8

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ಬೆಂಗಳೂರು-97.

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